

Research Report



Caroline, 3, examines a "Crops of Alberta" demonstration plot in Edmonton. Her researcher father says it is still a little early to predict if she will follow in his footsteps.

Farming for the Future 1989-90 awards

Increased emphasis placed on conservation research

To be successful in today's highly competitive international markets, Alberta's agriculture and food sector requires access to a constant supply of technological innovations. Well-directed agricultural research — like that being supported by the Farming for the Future Program — can produce these innovations.

In 1989, Farming for the Future passed the \$50 million mark in total financial support for agricultural research. By March 31, 1990, more than \$50.7 million in funding will have gone to an estimated 1,300 research and demonstration projects since the program started funding projects in 1979.

Farming for the Future uses two funding vehicles to help support research and demonstration activities. The more formal Research Program is geared toward academic and professional researchers. Including its current awards, the Research Program has, in total, provided more than \$47 million to 548 projects.

The purpose of the On-Farm Demonstration Program, Farming for the Future's other funding vehicle, is to speed up the transfer of research findings from the scientific to the farming community. Demonstrations represent the cooperative efforts of producers, extension staff, and specialists. In 1989-90, another \$600,000 has been allocated for On-Farm Demonstration projects.

This year, Farming for the Future is providing almost \$3.9 million to 99 research projects (36 new and 63 renewals) under its Research

Program. All projects have the potential to develop new techniques and to generate new information of value to Alberta farmers.

Many of the projects undertaken directly reflect the day-to-day interests and needs of producers and their local communities. For this reason, Farming for the Future is providing support for projects concerning proper management of water, land and soil resources.

"The conservation of our soil and water resources is crucial to the future development of sustainable agriculture in our province," says Ben McEwen, chairman of the Farming for the Future Council and deputy minister of Alberta Agriculture.

Sustainable agriculture, simply defined, is an industry that is economically viable while conserving or enhancing the quality of the environment and the resource base upon which agriculture depends.

"In this context, the degradation of soil is one of the most serious issues in agriculture," states Mr. McEwen. "It is crucial to develop methods of decreasing soil erosion and preventing chemical contamination if we are to preserve our soils as an agriculture resource."

Soil conservation is just one of a number of major environmental issues for governments, farmers and researchers alike. Possible future atmospheric and climatic changes make research in this area even more important.

"As we begin to take more notice of the earth's resources and try to balance the needs and pressures of the human population, it is necessary to find better ways and practices to

sustain agriculture," notes Mr. McEwen.

For example, one Farming for the Future project is studying cropping systems which conserve soil and use biological nitrogen fixation, rather than chemical fertilizer, as a source of nitrogen. Another project is focusing on the effects of zero tillage vs conventional tillage using straw removal and/or retention.

One of Farming for the Future's more recent projects examined available global climatic information to study the nature and extent of climatic change that may occur in Alberta. Other topics under study include: determining the effects of using polymers as soil conditioners, and determining the advantages of pulse banding fertilizers to improve productivity and conserve soil moisture.

"The assistance made available under Alberta's Farming for the Future agricultural research program has given opportunity for research which otherwise might not be possible," says Dr. Ralph Christian, executive director of Alberta Agriculture's Research Division. "The great success of Farming for the Future has been a definite asset to the agricultural communities of Alberta, and a wise investment of the Heritage Fund for both present and future generations."

[Editor's Note: On the following pages are listed the projects being supported under Farming for the Future's Research Program during 1989-90.]

RESEARCH PROGRAM PROJECT SUMMARIES — 1989-90

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
CEREALS AND OILSEEDS			
Breeding Regionally Adapted Canola Cultivars for Alberta Growing Areas • to develop high yielding, disease resistant canola cultivars adapted to the Peace River region and to southern Alberta	R.K. Downey	Agriculture Canada — Saskatoon	80,000
Evaluation and Development of Soft White Spring Wheats for Western Canada • to develop high yielding soft white wheats with good resistance to disease and sprouting	R.S. Sadasivaiah	Agriculture Canada — Lethbridge	78,000
Acceleration of Canola Variety Development for the Peace River and Southern Alberta Regions • to develop canola varieties adapted to the Peace River region and to irrigated dryland conditions in southern Alberta	D.L. Woods	Agriculture Canada — Beaverlodge and Lethbridge	220,000
Intensive Management Systems for Barley, Wheat, and Canola Production • to determine the effects of fertilizers, plant growth regulators, pesticides and stand density on barley, wheat and canola yields	D.C. Penney J.H. Helm	Alberta Agriculture — Edmonton and Lacombe	72,000
Advancing Wheat Adaptability to Acid Soil Conditions, Especially in North Western Alberta • to evaluate several sources of genetic resistance to soil acidity	P.J. Clarke	Agriculture Canada — Beaverlodge	38,000
Understanding and Alleviating Green Seeds in Spring Canola: Impact of Increased Early Frost Tolerance on Degreening • to assess frost tolerance during seed maturation in <i>Brassica napus</i> , <i>B. campestris</i> , and <i>B. juncea</i> , and to identify the superior lines	A.M. Johnson-Flanagan	University of Alberta — Edmonton	56,000
The Use of Microspore Culture to Evaluate Early Generation Hybrid Populations of <i>Brassica napus</i> • to test the microspore system for genetically stabilizing early flowering and disease resistant lines in early generations of hybrid <i>B. napus</i>	G.R. Stringam	University of Alberta — Edmonton	71,000
Genetic Sources of Herbicide Tolerance in Oats (<i>Avena sativa</i> L.) • to identify new sources of genetic resistance to five major wild oat herbicides; and to transfer these genes, through breeding and selection, to the genetic backgrounds of adapted Canadian cultivars	S. Kibite	Agriculture Canada — Lacombe	35,000
Rapid Development of Blackleg Tolerant <i>B. napus</i> Canola Cultivars Using Biotechnology • to collect and characterize a wide spectrum of virulent and avirulent isolates of blackleg which infect both Brassica and cruciferous weeds; and to develop a set of differentials to characterize the disease	G.R. Stringam	University of Alberta — Edmonton	25,000
CROP PROTECTION AND ENTOMOLOGY			
Development of Improved Methods of Forecasting Grasshopper Distribution and Abundance • to determine the effects of critical weather factors on grasshopper populations, and to incorporate findings into an improved system of outbreak prediction and description	D.L. Johnson	Agriculture Canada — Lethbridge	41,000
Quackgrass Control in Zero and Conventional Tillage Systems • to assess the effects of precisely timed, low rates of glyphosate (Roundup) and sethoxydium (Poast) on quackgrass control	K.N. Harker W.H. Vanden Born	Agriculture Canada — Lacombe and University of Alberta — Edmonton	64,000
Improving Herbicide Efficiency on Quackgrass and Other Perennial Weeds Which Have Dormant Buds Using PGRs • to determine the effects of plant growth regulators (PGRs) on herbicide efficiency, and to test herbicide/PGR treatments	J.S. Taylor	Agriculture Canada — Lacombe	29,000
Evaluation of Protective Work Wear for Agricultural Workers • to test currently available and new work wear for effectiveness in reducing pesticide penetration	E.M. Crown	University of Alberta — Edmonton	33,000
Effect of Brown Wheat Mite on Barley in Southern Alberta • to gain information on overwintering, dispersal and the effect of cropping practices on population levels of the brown wheat mite, and to determine the feasibility of cultural and chemical control measures	J.R. Byers	Agriculture Canada — Lethbridge	49,000
Cultural and Chemical Control of Downy Brome in Winter Wheat • to determine the time of establishment and effect of soil moisture and temperature on emergence of downy brome in winter wheat, and to test potential herbicides for selective control of downy brome	R.E. Blackshaw	Agriculture Canada — Lethbridge	47,000

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
Feasibility of Long Term Grasshopper Management • to evaluate the use of bran baits treated with low quantities of insecticide or <i>Nosema locustae</i> in large areas to reduce grasshopper populations	M. Dolinski	Alberta Agriculture — Edmonton	50,000
Screening and Evaluation of Plant Diseases for Biological Control of Weeds • to evaluate known pathogens for use as mycoherbicides, and to continue to screen new material for pathogens	A.S. McClay	Alberta Environment — Vegreville	30,000
Economic Assessment of Cabbage Maggot Damage in Canola • to develop a system for measuring the economic impact of root maggots in canola by using exclusion cages	G.C.D. Griffiths	Griffiths & Griffiths Ecological Consultants — Sherwood Park	35,000
Integrated Pest Management on Greenhouse Cucumbers in Alberta • to evaluate the effectiveness of short-term introductions of <i>A. cucumeris</i> against western flower thrips and to develop simple field bioassay techniques for evaluating the effectiveness of pesticides against western flower thrips and other greenhouse pests	M.Y. Steiner	Alberta Environmental Centre — Vegreville	46,000
Detection and Identification of Virulent Strains of <i>Leptosphaeria maculans</i> (Blackleg) Using Monoclonal Antibodies • to produce monoclonal antibodies against the virulent strain of <i>L. maculans</i> ; and to develop an enzyme-linked immunosorbent assay (ELISA) to rapidly detect and identify this fungus in canola seed and other plant tissues	R. Stace-Smith	Agriculture Canada — Vancouver	44,000
Influence of Crop Management on Control of Russian Wheat Aphid • to establish a set of management practices which will help moderate the damage done by the Russian wheat aphid	R.A. Butts	Agriculture Canada — Lethbridge	66,000
Sampling Methods for Russian Wheat Aphid in Cereals • to develop an efficient sampling method which can be used to determine when, where, and at what level the Russian wheat aphid is present in a field	R.A. Butts	Agriculture Canada — Lethbridge	72,000
Genetic Engineering of Crop Plants for Enhanced Resistance to Insect Pests and Plant Pathogens • to determine the feasibility of using genetic engineering to enhance the resistance of crop plants to insect damage and invasion by plant pathogenic microorganisms	A.A. Szalay	University of Alberta — Edmonton	85,000
FORAGES			
Low Temperature Nitrogen Fixation for Alfalfa • to evaluate selected strains of Rhizobia bacteria for the ability to fix nitrogen in cool conditions	W.A. Rice	Agriculture Canada — Beaverlodge	30,000
Yield and Quality of Pasture Grasses During Initial Spring Growth and Fall Regrowth • to determine how plant maturity, structure, and shape are related to the yield and quality of various pasture grasses	V.S. Baron J.R. King	Agriculture Canada — Lacombe and University of Alberta — Edmonton	35,000
Feasibility of Double Cropping and Intercropping of Winter Cereals for Fall Pasture • to assess intercropping and double cropping of spring and winter cereals as a means of extending the grazing season	V.S. Baron D.F. Salmon	Agriculture Canada — Lacombe and Alberta Agriculture — Lacombe	45,000
Fall Management of Three Orchard Grass Cultivars Under Simulated Intensive Grazing • to evaluate how the timing of late-season grazing affects the winter hardiness and spring regrowth of three orchard grass cultivars	J.R. King	University of Alberta — Edmonton	41,000
Restoration of Overgrazed <i>Festuca hallii</i> Rangeland by Short Duration Grazing • to redirect research towards an investigation into the use of short duration grazing to restore over-grazed <i>Festuca hallii</i> rangeland	A.W. Bailey	University of Alberta — Edmonton	22,000
Assessment of Winter Grazing on Rough Fescue Grasslands • to determine the feasibility of winter grazing pregnant cows on rough fescue grassland in the foothills region of Alberta	W.D. Willms	Agriculture Canada — Lethbridge	39,000
IRRIGATION			
Irrigation Scheduling to Maximize Yield of Soft White Wheat Under Intensive Crop Management • to compare the effects of frequent irrigation over the entire growing season with irrigation applied only at critical times	J.M. Carefoot	Agriculture Canada — Lethbridge	39,000

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
Evaluation of Single Delivery Flow Measurement Devices for Irrigation Application in Alberta • to develop and assess irrigation water metering devices for the individual farm turnout	J. Proznik	MPE Engineering Ltd. — Lethbridge	28,000
Management Program for Optimizing Irrigation Reservoir Supply Levels • to develop a reservoir management routine which incorporates demands, upstream supply capability and reservoir through-flow routing	J.M. Byrne	University of Lethbridge — Lethbridge	15,000
Development of an Automated Cost-Effective Surge Irrigation System • to develop an automated surge-flow surface irrigation system to provide precise intermittent application of irrigation water, increase irrigation efficiency, and save time	N. Foroud	Agriculture Canada — Lethbridge	27,000
LAND RESOURCES AND ENGINEERING			
Long-Term Influence of Tillage, Straw and Nitrogen on Soil Characteristics and Crop Yield • to evaluate the effects on crop yield of zero tillage versus conventional tillage, straw retention versus removal, and timing and method of nitrogen application	M. Nyborg	University of Alberta — Edmonton	49,000
Annual Legume Plowdown to Replace a Cultivated Fallow • to develop guidelines for the use of annual legume plowdown in order to maintain and improve soil nitrogen and organic matter levels	T.L. Jensen	Alberta Agriculture — Edmonton	48,000
Dryland Farming System Research for South and South Central Alberta • to develop an economic crop production system for the six soil areas in southern and south-central Alberta	R.H. McKenzie	Alberta Agriculture — Lethbridge	70,000
Maximizing Meadow Bromegrass Pasture Yield Through Optimum Fertilizer Nitrogen Management • to compare the efficiency of two N fertilizers (urea and ammonium) applied to meadow bromegrass in early spring, and to evaluate the influence of time of application on this efficiency	S.S. Malhi	Agriculture Canada — Lacombe	33,000
In-Bin Grain Moisture Monitoring • to test the feasibility of using soil moisture sensors to monitor the moisture content of grain in storage bins, and to establish whether the expansion/contraction of a grain mass can be used as a reliable indication of moisture content	J.J. Leonard	University of Alberta — Edmonton	in progress
Deep Tillage Tools for Soil and Water Conservation • to determine the effect of deep tilling on soil and water conservation, and to assess its long-term benefits	D.S. Chanasyk	University of Alberta — Edmonton	19,000
The Impact of Grazing on Rangeland Hydrology • to study the hydrologic impact of grazing on the sloped areas of the foothills fescue rangelands	D.S. Chanasyk	University of Alberta — Edmonton	42,000
Lessening the Economic Risks Associated with Nitrogen Fertilization of Cereals • to test the agronomic feasibility of various post-seeding methods of applying nitrogen in different soil zones	J. Ashworth	Norwest Soil Research Ltd. — Edmonton	40,000
On Site Biotechnologies for Soil Conservation and Risk Management on Luvisolic Soils • to develop cropping systems which conserve soil, are economically sound, and use biological nitrogen fixation, where practical, to supply nitrogen	W.B. McGill	University of Alberta — Edmonton	60,000
Management of Farm Dugouts as Water Supplies; Use of Lime for Algal Control • to develop a program for the use of lime to provide clean water in farm drinking-water dugouts	E.E. Prepas	University of Alberta — Edmonton, and Alberta Forestry, Lands and Wildlife — Peace River	28,000
Effect of Feeding, Flooring and Ventilation on Size and Character of Airborne Particles in Pig Housing • to study the behavior of airborne particles in an environmentally controlled room containing no animals, pen partitions, feeders, or slatted floors	J.R. Feddes	University of Alberta — Edmonton	35,000
The Pulse Bander: A Conservation Tool for Forage Production • to study the effect of pulse banding fertilizers into established grass cover in order to improve productivity and conserve soil moisture	M.J. Rowell	Norwest Soil Research Ltd. — Edmonton and Agriculture Canada — Lacombe	27,000

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
Effects of Super Absorbent Polymers on Soil Water Related Properties and Crop Yield • to determine the effects and economic benefits of several of the most effective polymers used to enhance soil moisture characteristics; and to determine the longevity of the polymers in the soil mixture	C. Chang	Agriculture Canada — Lethbridge	24,000
Amelioration of Soil Compaction Problems Through Appropriate Tillage • to determine the effects of soil compaction on: draft, fuel, and energy requirements for different tillage and subsoiling practices; infiltration rate and runoff before and after tillage treatments; and to assess the cost effectiveness of ameliorative treatments	C. Chang	Agriculture Canada — Lethbridge	29,000
Towards a Strategy for Adapting to Climate Change in Alberta • to assess the significance of global climate change predictions to Alberta; and to identify an appropriate climate modelling approach that can be used to develop strategies for adapting to the predicted changes	R.J. Fessenden	Alberta Research Council — Edmonton	9,000
NON-RUMINANTS			
Meat Quality from Pigs Heterozygous for the Halothane Gene in Different Breeds of Pigs • to determine if the Halothane gene is expressed in meat colour and structure scores from pigs that are heterozygous for the Halothane gene	A.P. Sather	Agriculture Canada — Lacombe	22,000
Influence of Dietary Fat Level and Composition on Protein Deposition in the Rapidly Growing Broiler • to assess the effects of diets varying in the level and composition of dietary fat on net protein and energy gain, and to assess the underlying rates of protein synthesis and degradation	V.E. Baracos	University of Alberta — Edmonton	35,000
Effect of Immunization of Gilts Against Paternal Antigens on Reproductive Performance • to determine how pre-immunizing young gilts against antigens from boars affects conception rate, ovulation rate and embryo survival	R.J. Christopherson	University of Alberta — Edmonton	46,000
Post-Weaning Nutrition of the Pig: Nutrient Interactions Among Dietary Components • to determine the optimum levels of digestible protein, amino acids, fat and fiber in diets of early-weaned pigs	W.C. Sauer	University of Alberta — Edmonton	43,000
The Effects of Nutrition on Embryo Mortality in Swine • to determine the effects of normal or high feed intake levels in early gestation on embryo mortality and sow weight loss during lactation, and to determine the hormonal profile of sows fed high or low levels during lactation and early gestation	F.X. Aherne	University of Alberta — Edmonton	27,000
Nutritional Significance of Biologically Enriched Egg Yolk with Omega-3 Fatty Acids • to develop eggs and egg products biologically enriched with Omega-3 fatty acids by including full-fat canola, flax seed or fish products in laying-hen diets	J.S. Sim	University of Alberta — Edmonton	39,000
Evaluation of Full-Fat Canola and Barley in Commercial Broiler Diets • to compare high and low energy diets containing 60% Barlcan with conventional wheat/corn/soybean meal diets used in commercial production	R.E. Grimson	Lakeside Feeders Ltd. — Brooks	36,000
The Formulation of Pig Diets on the Basis of the Digestible Amino Acid Supply • to determine the various advantages of formulating swine rations on the basis of ileal amino acid digestibility values	W.C. Sauer	University of Alberta — Edmonton	23,000
PROCESSING AND MARKETING			
Immobilization Technology for Accelerated Canola Sauce Fermentation • to develop a technique that would reduce the costs and time needed to produce a canola-based substitute for soy sauce	B. Ooraikul	University of Alberta — Edmonton	48,000
Use of Biotechnology to Develop Innovative Systems for Preservation of Meats • to select and develop strains of bacteria that will inhibit spoilage and disease-causing bacteria in meats	M.E. Stiles	University of Alberta — Edmonton	38,000
Feasibility of Lactic Acid Starter Culture Production in Alberta • to evaluate various strains of bacteria used in cheese production in order to establish a starter culture industry in Alberta	M.E. Stiles	University of Alberta — Edmonton	30,000

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
A General Equilibrium Model of Alberta's Agricultural Sector • to develop a model of the Alberta economy emphasizing the agricultural sector, and to use this model to evaluate policy initiatives	M.B. Percy	University of Alberta — Edmonton	8,000
Export Markets for Canada's Foodgrains and Feedgrains • to assess the market prospects for Western Canadian barley and wheat in the balance of the 1980s	T.S. Veeman	University of Alberta — Edmonton	34,000
Farm Agricultural Data Sources and Needs, and Related Planning • to identify the present and potential agricultural and financial data needs of Alberta's agricultural researchers, policy-makers, managers and advisors	G.A. Mumey	University of Alberta — Edmonton	35,000
Incidence, Origin and Control of Pathogenic Bacteria in Raw Milk and Milk Products • to determine the incidence of pathogenic bacteria in the raw milk supply in Alberta (specifically <u>Salmonella</u> , <u>Listeria</u> , and <u>Campylobacter</u>) and the origin of pathogenic isolates, and to develop a strategy to limit the numbers of pathogenic organisms in raw milk and dairy products	H. Jackson	University of Alberta — Edmonton	16,000
Future Directions for the Alberta and Canadian Sheep Industry • to analyze the factors responsible for the decline in the Canadian sheep industry, and to identify the appropriate future direction for the industry	M.H. Hawkins	University of Alberta — Edmonton	16,000
The Demand for Red Meats and Related Foods in Canada • to derive updated and more comprehensive estimates of the demand relationships for red meats and related foods in Canada, and to assess factors underlying changes in consumption patterns for red meats in recent years	M.M. Veeman	University of Alberta — Edmonton	35,000
Comparative Evaluation of Commercial Milk Coagulants for Increased Cheese Production Efficiency and Quality • to study the qualitative and quantitative proteolytic characteristics of milk clotting enzymes in commercial coagulants used in Alberta	F.H. Wolfe	University of Alberta — Edmonton	35,000
Macroeconomic Impacts on Canadian Agricultural Prices • to assess the impact of macroeconomic forces on prices paid by producers as well as on the prices they receive and the resulting impact on agricultural terms of trade	W.L. Adamowicz	University of Alberta — Edmonton	22,000
Analysis of Alberta Honey Composition to Aid Honey Exports • to establish quality factors in Alberta honey samples including detailed sugar composition, enzyme levels, the amino acid proline, moisture and acidity, and ash levels	P. Sporns	University of Alberta — Edmonton	31,000
Economic Feasibility of International Trade in Feedgrains Between Alberta and the Northwestern U.S.A. • to assess the economic feasibility of exporting barley from Alberta to the U.S. given price and cost conditions characteristic of the 1980s	M.L. Lerohl	University of Alberta — Edmonton	22,000
Evaluation of the Capital and Credit Needs of Alberta Farmers • to develop a farm capital and credit model to estimate capital and credit needs of Alberta farmers over the next five years	R.W. Ashmead	AgriTrends Research Inc. — Calgary	40,000
Frying Performance of Canola Fats and their Effects on Convenience Food Quality • to evaluate the frying performance of canola fats and commonly used frying fats; and to assess their effect on the quality of convenience foods using sensory, chemical and instrumental methods	Z.J. Hawrysh	University of Alberta — Edmonton	32,000
The Effects of Spray-Chilling on Beef Quality and Spoilage • to determine the effects of the duration of intermittent water sprays on carcass shrink and on muscle quality, purge loss and bacterical spoilage of boxed beef	G.G. Greer	Agriculture Canada — Lacombe	27,000
RUMINANTS			
Vitamin E and Selenium Deficiency: Immunological Manifestations • to study the effects of vitamin E and selenium deficiencies on disease problems in livestock	B.R. Blakley	Western College of Veterinary Medicine — Saskatoon	34,000
Manipulation of Hormones in Calves to Improve Their Rate of Growth • to evaluate methods of immunizing calves against somatostatin (an inhibitor of growth hormone release), and to determine the effects of this immunization on calf growth rates and feed efficiency	G.J. Mears	Agriculture Canada — Lethbridge	45,000

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
Effect of Rumen Microbial Metabolism on Selenium Requirements of Ruminants • to study the availability of selenium under different dietary regimes in order to more accurately determine selenium requirements	L.M. Rode	Agriculture Canada — Lethbridge	40,000
Vaccines Against Viruses Causing Bovine Respiratory Disease • to reduce losses due to shipping fever by developing better vaccines and improving the animal's ability to fight off the disease	L.A. Babiuk	Western College of Veterinary Medicine — Saskatoon	58,000
Endocrinological and Genetic Analysis of Superior Growth in Cattle • to characterize hormonal and genetic factors involved in growth regulation in cattle	R.K. Salmon	University of Alberta — Edmonton	30,000
Influence of Temperature on Protein and Amino Acid Digestion in Ruminants • to assess the effect of a cold environment on amino acid digestion, and to determine optimal dietary requirements in cold and warm environments	R.J. Christopherson	University of Alberta — Edmonton	25,000
Association of Respiratory Tract Colonization with Adherence of <i>Pasteurella haemolytica</i>-Al to Epithelial Cells • to determine if an association exists between colonization of the bovine respiratory tract by <i>Pasteurella haemolytica</i> and increased <i>in vitro</i> adherence of this bacterial species to bovine oropharyngeal epithelial cells	J.W. Costerton	University of Calgary — Calgary	24,000
Development of a Recombinant Vaccine to Bovine Rotavirus/Coronavirus • to develop and test recombinant DNA produced vaccines against rota and coronavirus infections, and to develop an oral delivery system for these vaccines	L.A. Babiuk	Western College of Veterinary Medicine — Saskatoon	38,000
The Enhancement of Casein Production Through Genetic Manipulation of a Bovine Casein Gene • to increase milk's protein content by genetically engineering a highly active K-casein gene	R.K. Salmon	University of Alberta — Edmonton	40,000
Rates of Digesta Flow and Rumination in Cattle • to determine the importance of rates of passage and amount of chewing on voluntary intake, digestibility, and energy losses	G.W. Mathison	University of Alberta — Edmonton	35,000
Influence of Somatostatin on Cold Tolerance in Ruminants and Response to Somatostatin Antibodies • to determine the role of somatostatin in regulation of body temperature, energy, protein metabolism and digestion in different environmental conditions, and to determine whether treatment with antibodies to somatostatin will improve cold tolerance of the newborn and growth and feed efficiency in cold environments	R.J. Christopherson	University of Alberta — Edmonton	30,000
Factors Affecting the Accuracy of Bull Evaluation for Gain in Bull Test Station • to estimate the minimum length of test period needed for proper evaluation of weight-gain potentials of bulls, and to quantify the relative importance of age, birth weight, initial weight, age of dam, et cetera on variation in weight gain	M. Makarechian	University of Alberta — Edmonton	6,000
Comparison of Natural Service Fertility of Yearling and Two-Year Old Bulls • to compare the fertility of bulls under different breeding pressures	M. Makarechian	University of Alberta — Edmonton	8,000
The Importance of Maintaining Normal Blood Potassium Levels When Treating Grain Overload • to determine whether hypokalemia (decrease in blood potassium levels) consistently develops in cattle experiencing grain overload	E.C. Crichlow	University of Saskatchewan — Saskatoon	34,000
Development of a <i>Haemophilus somnus</i> Animal Model and Testing of Vaccine Components • to develop a challenge model in calves which accurately reproduces the clinical symptoms, pathological features, and general disease progression of <i>H. somnus</i> infections as they are seen in natural field outbreaks; and to develop and test vaccines which would protect calves from developing <i>H. somnus</i> pneumonia and other <i>H. somnus</i> infections	H.G. Deneer	Veterinary Infectious Disease Organization — Saskatoon	38,000
Viral Infection Dynamics in Pre-Weaned and Early Feedlot Beef Calves • to determine the time sequence or dynamics of natural individual and multiple concurrent viral infections (IBRV, PI, BRSV, and BVDV) in post-weaned feedlot calves by low-impact serial serological testing	D. Armstrong	Alberta Agriculture and University of Alberta — Edmonton	38,000

PROJECT TITLE AND OBJECTIVE	RESEARCH MANAGER	INSTITUTION & LOCATION	FUNDING AWARDED
The Role of Anaerobic Rumen Fungi in Cellulose Digestion and Animal Nutrition • to isolate the predominant rumen fungi found in ruminants fed a variety of common forage and/or concentrate diets; and to develop a profile of feed-dependent fungal colonization of ruminants in Alberta	K.-J. Cheng	Agriculture Canada — Lethbridge and University of Calgary — Calgary	40,000
Use of Neutral Detergent Fibre in Dairy Cattle Diet Formulation • to evaluate the effects of forage quality on the concentration of dietary neutral detergent fibre necessary to optimize rumen function and productivity of dairy cows	K.A. Beauchemin	Agriculture Canada — Lethbridge	45,000
Effects of Oil Treatment of Grains on Rumen Digestion and Animal Performance • to compare digestion of physically processed grain treated with specific levels of canola oil; and to assess the capacity of canola oil to alter the site of starch digestion in feedlot cattle	K.-J. Cheng	Agriculture Canada — Lethbridge	27,000
SPECIAL CROPS			
Safflower Management for Optimizing Yield and Quality • to evaluate safflower management techniques in order to prepare a detailed safflower production package	H.H. Muendel B. Roth	Agriculture Canada — Lethbridge and Alberta Agriculture — Lethbridge	61,000
Control of Bacterial Ring Rot and Blackleg Symptomless Infections of Potato • to study the symptomless phases of two potato diseases to determine the conditions necessary for their occurrence	S.H. DeBoer	Agriculture Canada — Vancouver	41,000
Increasing Tuber Yield by Manipulating the Physiological Age of Potato Seed Tubers • to investigate the effects of storage temperature on tuber yield, grade and earliness	N.R. Knowles	University of Alberta — Edmonton	58,000
Agronomic Studies Emphasizing Uniform, Earlier Establishment, Maturity and Adaptability of Cool Season Pulse Crops • to study agronomic practices for improved production of lentils, peas and fababeans	R.G. Gaudiel	Alberta Agriculture — Brooks and Lacombe	48,000
Adaptability and Agronomic Practices of Herbs, Spices and Essential Oil Crops for Alberta • to determine agronomic practices for commercial production of herbs and spices in Alberta	R.G. Gaudiel	Alberta Agriculture — Brooks	25,000
Disease Elimination in Potato Breeding Clones • to develop a source of disease-tested seed of clones included in the regional trial system of the potato breeding program	D.R. Lynch	Agriculture Canada — Lethbridge	51,000
Salinity and Cold Tolerance of Ornamental Trees • to develop reliable recommendations under field conditions for salinity and cold tolerance of several species of trees and shrubs grown in Alberta	R.C. McKenzie	Alberta Special Crops and Horticultural Research Center — Brooks	17,000
Overwintering Container Stock: How Dormancy Relates to Root and Shoot Cold Hardiness • to characterize factors controlling root hardiness; and to determine the relationship between dormancy and shoot and root cold hardiness	H.M. Mathers	Alberta Special Crops and Horticultural Research Center — Brooks	9,000
Commercial Adaptability, Feasibility, and Management Practices of Selected Essential Oil and Spice Crops in Alberta • to evaluate and determine the commercial adaptability of spice crops using commercial equipment for establishment, maintenance, harvesting, and processing operations	R.G. Gaudiel	Alberta Special Crops and Horticultural Research Center — Brooks and Alberta Agriculture — Lethbridge	39,000

**For more information on Farming for the Future projects, call:
The Ag-Research BBS (403) 438-2209 (dataline)**

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Farming for the Future is administered by the **Farming for the Future Council**. The Council has 15 members, including producers, scientists and provincial and federal government representatives. Further information about the Council or about **Farming for the Future** can be obtained from Alberta Agriculture, Research Division, #202, 7000-113 Street, Edmonton, Alberta, T6H 5T6